REMARKS

Entry of the foregoing, reexamination and further and favorable reconsideration of the subject application in light of the following remarks, pursuant to and consistent with 37 C.F.R. § 1.112, are respectfully requested.

By the foregoing amendment, claims 4, 5, 15, 21, 22, 23 and 26 have been amended. In particular, claims 4, 5, 21, 22, and 23 have been amended to recite that , even though hydrogen peroxide is removed prior to subjecting the material to UV light, a residual or trace quantity of hydrogen peroxide absorbed by or located adjacent to any microorganisms present on the material is retained. Support for such amendments can be found throughout the originally filed application, including for instance page 7, lines 3-9 and page 11, lines 13-17. Claims 15 and 26 have been amended for grammatical-type purposes. No new matter has been added.

SUBSTANCE OF INTERVIEW

Applicant acknowledges the courtesy extended to the undersigned representative by Examiner Chorbaji and Primary Examiner Jastrzab during the interview conducted on August 4, 2004.

While all of the claims were presented during the interview, applicant's representative focused on the independent claims since the arguments traversing the rejections of such independent claims apply equally to the dependent claims.

In the interview, the anticipation rejection which utilizes the DiGeronimo patent, United States Patent No. 4,494,357 (hereinafter "the '357 patent"), was discussed. The obviousness rejections, which all utilize the '357 patent as the primary reference, were also discussed. The specific arguments presented by applicant's representative during the interview with regard to the anticipation

rejection and the obviousness rejections are incorporated below in applicant's response to each individual rejection.

REJECTION UNDER 35 U.S.C. § 102(b)

Claims 5, 17, 21, 23 and 25-26 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by the '357 patent. This rejection is respectfully traversed.

For prior art to be anticipatory, every element of the claimed invention must be disclosed in a single item of prior art in the form literally defined in the claim. *See, e.g., Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 231 U.S.P.Q. 81, 90 (Fed. Cir. 1986). Here, the '357 patent fails to disclose **every element** of applicant's claimed invention **in the form literally defined in the claims**.

In the Official Action, the Examiner cites to the discussion of hydrogen peroxide treatment in column 4 (tables 2-3) of the '357 patent and figure 2 of the '357 patent for the drying and UV irradiation steps. However, contrary to the Examiner's conclusion, the '357 patent fails to teach an apparatus or method in which material is treated with hydrogen peroxide, a substantial amount of hydrogen peroxide is removed by applying air, and then the material is subjected to UV radiation.

The discussion of hydrogen peroxide treatment in columns 2-4 of the '357 patent do not use air treatment in combination with UV radiation. Rather, the use of hydrogen peroxide in columns 2-4 are either hydrogen peroxide treatment alone or hydrogen peroxide and heat. As can be seen from the '357 patent, the discussion of hydrogen peroxide in columns 2-4, was for purposes of comparing the effect of conventional techniques on microorganisms against the invention of the '357 patent which was directed to the combination of ultraviolet and ultrasonic irradiation. No

place in columns 2-4, or in any other location for that matter, does the '357 patent disclose hydrogen peroxide treatment, air **and** UV radiation.

Figure 2 of the '357 patent, which is the disclosed invention of the '357 patent, depicts a continuous sterilization process that begins with a liquid bath or vat in which ultrasonic energy would be radiated through the liquid, then air knives for drying the material and next a source of ultraviolet light. With regard to the ultrasonic energy, it is acknowledged that applicant's claims do not exclude such treatment. Nonetheless, the '357 patent fails to disclose, either explicitly or inherently, that the liquid in the bath can be or is hydrogen peroxide. The only mention in the '357 patent of what the liquid may be in the vat or bath of Figure 2 is located in claim 1 of the '357 patent. Claim 1 of the '357 patent recites that the apparatus includes "a vat of liquid free of chemical biocide . . . ." Hydrogen peroxide is not a liquid "free of chemical biocide."

Thus, every element of the present inventor's claimed invention, is not dislclosed in the '357 patent **in the form literally defined in the claims**.

Moreover, the '357 patent fails to disclose, either explicitly or inherently, that hydrogen peroxide is removed while retaining a residual or trace quantity of hydrogen peroxide which is absorbed by or located adjacent to any microorganisms present on the material. It is the synergy between this residual or trace quantity of hydrogen peroxide which is retained and the UV radiation which kills the microorganisms on the material. Thus, **every element** of applicant's claimed invention is not disclosed by the '357 patent

For at least the reasons discussed above, the '357 patent fails to disclose every element of applicant's apparatus and method claims in the form literally

defined in such claims. Accordingly, the '357 patent is not anticipatory prior art. Withdrawal of this rejection under 35 U.S.C. § 102(b) is thus respectfully traversed.

REJECTIONS UNDER 35 U.S.C. § 103(a)

The Examiner has set forth a number of rejections under 35 U.S.C. § 103(a) which all utilize the '357 patent as the sole or primary reference. Specifically, the rejections are as follows:

(i) claims 2-3, 15, 22 and 24 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over the '357 patent;

(ii) claim 4 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over the '357 patent in view of Loliger et al. (United States Patent No. 3,692,468);

(iii) claim 6 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over the '357 patent in view of Lagunas-Solare et al. (United States Patent No. 5,364,645);

(iv) claims 18 and 27 been rejected under 35 U.S.C. § 103(a) as being unpatentable over the '357 patent in view of Castberg et al. (United States Patent No. 5,744,094).

Applicant respectfully traverses each of these rejections as the '357 patent, taken alone or in combination with any of the other patents cited by the Examiner, fails to teach or suggest applicant's claimed methods and apparatuses

To establish a *prima facie* case of obviousness, the Examiner still must provide for every element of the claimed invention either through the combination of references or the reference(s) modified by the Examiner in view of the contemporary knowledge in the field at the time of the claimed invention.

The '357 patent does not teach or suggest every element of applicant's claimed methods and apparatuses. As discussed above, the '357 patent fails to teach an apparatus or method in which material is treated with hydrogen peroxide, a substantial amount of hydrogen peroxide is removed by applying air, and then the material is subjected to UV radiation. The '357 patent also fails to suggest an apparatus or method utilizing the combination of steps.

While Figure 2 depicts a continuous sterilization process which begins with a liquid bath or vat in which ultrasonic energy would be radiated through the liquid, then air knives for drying the material and next a source of ultraviolet light, the '357 patent teaches away from using a product like hydrogen peroxide as the liquid in the bath. Specifically, column 2, lines 19-23 state that an advantage of the sterilization process of the '357 patent (which includes Figure 2) is that sterilization can occur without use of any chemical sterilants which may have undesirable properties. Also, claim 1 of the '357 patent specifically recites that the vat of liquid is free of chemical biocide. Since the '357 patent teaches away from the present inventor's claimed invention, the '357 patent lacks the necessary motivation to utilize hydrogen peroxide in combination with the air knives and UV radiation. Thus, one of ordinary skill in the art would neither make the combination nor possess a reasonable expectation of success in doing so.

Additionally, while Figure 2 of the '357 patent provides a means for drying the sonicated material by air knives, the '357 patent makes no mention as to how much liquid may be removed and/or retained. As discussed previously, the important discovery made by the present inventor is that, even though hydrogen peroxide is removed from the packaging sheet material, a residual or trace quantity of the

hydrogen peroxide is absorbed or otherwise retained or adjacent to any microorganisms that are present on the packaging sheet material. This residual or trace quantity of hydrogen peroxide which is absorbed by or otherwise retained in or near the microorganisms is thus available to react synergistically with the UV light to render the microorganisms non-viable and/or sterilize the material.

Attached hereto as Exhibit A is a copy of an article by Reidmiller et al. (Journal of Food Protection, 66(7): 1233-40 (2003)). The Reidmiller et al. article provides results of the synergy between hydrogen peroxide that is retained or absorbed by microorganisms after drying and UV irradiation to kill microorganisms in sterilization procedures for packaging materials. See, for instance, Figure 5.

Neither the Loliger et al patent, the Lagunas-Solare et al. patent, nor the Castberg et al. patent remedy the serious deficiencies in the '357 patent. Thus, even if the Loliger et al patent, the Lagunas-Solare et al. patent, or the Castberg et al. patent were to be combined with the '357 patent, one of ordinary skill in the art would still not arrive at the present inventor's claimed methods and apparatuses.

Accordingly, a proper *prima facie* case of obviousness has not been established. Therefore, withdrawal of each of the obviousness rejections set forth in the Official Action is respectfully requested.

In view of the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order. Such action is earnestly solicited.

In the event that there are any questions relating to this Reply, or the application in general, it would be appreciated if the Examiner would telephone the undersigned attorney concerning such questions so that the prosecution of this application may be expedited.

Respectfully submitted,

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